

Claims

1. A surface deformation actuation structure, comprising

- a deformable membrane that has a first surface and a second surface opposite said first reflective surface;
- an array of actuators located facing the second surface, each actuator having an actuating surface, each actuator being arranged to actuate displacement of the actuating surface substantially perpendicularly to the second surface;
- an array of actuating connections, each coupled to the actuating surface of a respective one of the actuators in the array and a respective point of the second surface substantially opposite the actuating surface, each actuating connection having anisotropic stiffness, substantially transmitting movement perpendicular to the second surface and leaving planar displacement and/or local rotation of the second surface substantially free.

2. A surface deformation actuation structure according to claim 1, wherein the array of actuators comprises

- a variably magnetizable base plane,
- an array of variably magnetizable islands on said base plane;
- actuator coils, each running around a respective one of the islands;
- a system of variably magnetizable walls on the base plane, the walls dividing a surface of the base plane into separate cells, each containing a respective one of the islands and coils;
- a variably magnetizable resilient surface, with surface parts that each rest on at least one of the walls of respective cells, extend over a respective one of the islands and contain a respective one of the actuating surfaces.

3. A surface deformation actuation structure according to claim 2,

- 25 comprising permanent magnets placed on top of the islands.

4. A surface deformation actuation structure according to claim 1, wherein the array of actuators comprises a support plate and the surface deformation actuation structure comprises

- a support structure, and

5 - an array of rod shaped connection elements connecting the support structure and support plate, leaving space to permit air to circulate between the support structures and the support plate, each connection element having anisotropic stiffness, substantially limiting a maximum distance between the support plate and the support structure to a predetermined value, without opposing
10 transverse relative movement between the support structure and the support plate.

5. A surface deformation actuation structure according to claim 4, wherein the support structure comprises a honeycomb structure with cells that extend perpendicular to the support plate, and wall segments surrounding the
15 cells at least in planes perpendicular to the support plate, the connection elements connecting junctions of wall segments to the support plate.

6. A surface deformation actuation structure according to claim 5, comprising thermal isolation material between the wall segments and inner spaces of the cells, the cells being open to permit air circulation from and/or to
20 the support plate through the cells.

7. A surface deformation actuation structure according to claim 1, wherein the first surface is an optical mirror surface.

8. A surface deformation actuation structure according to claim 1, wherein each actuation connection is rod shaped and at least ten times longer
25 perpendicular to the second surface than wide.

9. An actuator array comprising

- a variably magnetizable base plate,

- an array of variably magnetizable islands on said base plate;

- actuator coils, each running around a respective one of the islands;

- a system of variably magnetizable walls on the base plate, the walls dividing a surface of the base plate into separate cells, each containing a respective one of the islands and coils;
 - a variably magnetizable resilient surface, with surface parts that each rest on at least one of the walls of respective cells, extend over a respective one of the islands and contain a respective one of the actuating surfaces.
- 5 10. An actuator array according to Claim 9 comprising permanent magnets placed on top of the islands.
11. A support construction, comprising
- 10 - a support plate;
- a support structure; and
- an array of rod shaped connection elements connecting the support structure and support plate, leaving space to permit air to circulate between the support structures and the support plate, each connection element having anisotropic
- 15 stiffness, substantially limiting a maximum distance between the support plate and the support structure to a predetermined value, without opposing transverse relative movement between the support structure and the support plate.
12. A support construction according to claim 10, wherein the support
- 20 structure comprises a honeycomb structure with cells that extend perpendicular to the support plate, and wall segments surrounding the cells at least in planes perpendicular to the support plate, the connection elements connecting junctions of wall segments to the support plate.
13. A support construction according to claim 11, comprising thermal
- 25 isolation material between the wall segments and inner spaces of the cells, the cells being open to permit air circulation from and/or to the support plate through the cells.